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An interpersonally based intervention for low-income pregnant women with intimate partner violence: a pilot study

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Abstract

This study assessed the initial feasibility, acceptability, and efficacy of an intervention aimed at reducing depression and posttraumatic stress disorder (PTSD) in a sample of low-income pregnant women with recent intimate partner violence (IPV). Fifty-four women were randomly assigned to the intervention or control group. The intervention consisted of four sessions during pregnancy and one “booster” session within 2 weeks of delivery. Based on principles of Interpersonal Psychotherapy, the intervention was designed to help participants improve their interpersonal relationships, including their social support networks, and master their role transition to motherhood. Assessments were administered at four time points (intake, 5–6 weeks post-intake, 2 weeks postpartum, 3 months postpartum) to assess for depression, PTSD, and IPV. The intervention did not significantly reduce the likelihood of a major depressive episode, PTSD, or IPV during pregnancy or up to 3-month postpartum. However, we found moderate effects for the intervention in reducing symptoms of PTSD and depression during pregnancy and a large effect for PTSD symptoms from pregnancy up to 3 months postpartum. This study suggests some initial support for our intervention. Larger randomized trials are needed to further examine the intervention both during and after pregnancy.

Keywords

Pregnancy; Intimate partner violence; Intervention; Depression; Posttraumatic stress disorder

Introduction

Intimate partner violence (IPV) affects approximately 1.5 million women in the USA every year (CDC.gov 2009). Furthermore, rates of IPV are highest among women during their peak childbearing years (Bachman and Saltzman 1995; Martin et al. 2001). In a review of IPV studies, the prevalence of IPV prior to pregnancy (within the past year) ranged from 3% to 9% (Gazmararian et al. 1996). Some researchers suggest that the actual prevalence may

be even higher due to reluctance of women to disclose IPV, especially during pregnancy (Rennison and Welchans 2000). Moreover, IPV during pregnancy is strongly related to postpartum IPV (Martin et al. 2001) and in one study, Stewart (1994) reported that 90% of women abused during pregnancy were also abused within 3 months postpartum, with 52% requiring medical care for these postpartum injuries.

Although IPV at any time during a woman's life is devastating, women who experience IPV during the perinatal period are at risk not only for their own health but also for the health of their developing fetus. A range of negative health outcomes for the woman have been reported which include physical injuries, disproportionate use of primary care and emergency services, elevated rates of chronic disease, and poor mental health (Campbell et al. 2000; Gottlieb 2008). In addition, IPV during pregnancy is related to maternal infections, anemia, failure to gain weight during pregnancy, and other adverse obstetric outcomes that include preterm labor, preterm low birth-weight, preterm delivery, and neonatal death (see Huth-Bocks et al. 2002 for review; Coker et al. 2004; Sarkar, 2008). Overall, a consistent finding across varied clinical samples is that the mental health consequences most frequently associated with IPV are posttraumatic stress disorder (PTSD; Astin et al. 1993; Gleason 1993; Houskamp and Foy 1991; Kemp et al. 1991; Roberts, Lawrence et al. 1998; Saunders 1994; West et al. 1990; Woods 2000) and depression (Bergman et al. 1987; Cascardi and O'Leary 1992; Gleason 1993; Golding 1999; Hathaway et al. 2000; Roberts et al. 1998; West et al. 1990; Zlotnick et al. 1998). The only two studies to date that have examined the rate of PTSD in perinatal women have found prevalent rates for current PTSD of 2.3% to 3% (Smith et al. 2004; Söderquist et al. 2004). Virtually no research has been conducted on the rates of PTSD among postpartum women with IPV. Likewise, there have been no studies that have examined the rate of depression among women during the perinatal period with IPV.

Research has found that women with IPV during pregnancy have an increased risk of physical abuse in the postpartum period which is associated with postpartum depression in over 50% of these women (Stewart 1994), and the onset of the depression usually occurs within 8 to 10 weeks postpartum (Ansara et al. 2005). Both depression and PTSD are associated with severe morbidity and psychosocial impairment (Mertin and Mohr 2001), which may compromise a mother's ability to take care of herself, her newborn, and other children and increase her vulnerability to further abuse. Furthermore, perinatal depression has been found to be related to increased risk for recurrent episodes of depression, chronic depressive disorder, and infant and child developmental difficulties (Beck 1998; Carter et al. 2001; Cicchetti et al. 2000; Cogill et al. 1986; Hay et al. 2001; Kurstjens and Wolfe 2001; Lyons-Ruth et al. 1986; Lyons-Ruth et al. 2000; Martins and Gaffan 2000; Murray 1992; Murray and Cooper 1997; Newport et al. 2001; Nonacs and Cohen 1998; Philipps and O'Hara 1991; Sharp et al. 1995; Sinclair and Murray 1998; Weinberg and Tronick 1998). Additionally, mothers with PTSD have more difficulty in providing bonding, protection, and support to a developing child (Graham-Bermann 1998).

Although experts strongly recommend increased assessment and interventions for IPV in health-care settings (Campbell et al. 2000), the existing literature provides few models for interventions for pregnant women with IPV. To date, there exist only two published randomized studies in which the intervention directly targeted pregnant women with IPV within the last year. Both studies involved advocacy services (i.e., advice on safety, choice making, and problem solving as well as community resources) with one ethnic group (Chinese women or Hispanic women; McFarlane et al. 2000; Tiwari et al. 2005). The only randomized controlled study to date (Tiwari et al. 2005) was conducted in Hong Kong with Chinese pregnant women who received either a 30-min advocacy session or standard care (i.e., information on community resources for abused women). After 6 weeks postpartum,

women in the intervention reported less psychological (but not sexual) abuse, less minor (but not severe) physical violence, and had significantly lower postpartum depressive symptoms. The other study (McFarlane et al. 2000), conducted in the USA with Latino pregnant women, compared a “counseling” intervention (i.e., unlimited access to onsite IPV advocates who offered support, education, referral, assistance in accessing IPV and other resources for duration of pregnancy), and/or an “outreach” intervention (i.e., “counseling” plus a trained non-professional mentor mother offering support, education, referral, assistance in accessing resources with personal visits) to a “brief” intervention (i.e., women offered information on community resources and a brochure). At 6-, 12-, and 18-month postpartum, there were no significant differences in severity of abuse among the three interventions. A related intervention study targeted women during the postpartum period where the child was at high risk for maltreatment (e.g., parental substance use, poor mental health, domestic violence, etc.). This intervention involved a long-term intensive home visitation by trained professionals designed to improve family functioning and promote child health and prevent child abuse. While the program was in progress (3-year period), women in the intervention group reported lower rates of IPV, specifically physical violence. No differences were found between the intervention and control groups at 4- to 6-year follow-ups (Bair-Merriett et al. 2010).

Clearly, more randomized controlled intervention studies are needed that include other racial/ethnic groups of pregnant women with IPV and include other primary outcomes in addition to the severity of abuse; a main outcome measure that depends on the behavior of an offender who is not directly involved in the intervention. Furthermore, a woman’s behavior may be unrelated to the occurrence of abuse (McFarlane et al. 1998; Parker et al. 1999; Sullivan 2003). IPV interventions that lead to other outcomes, such as improvements in level of depression or PTSD symptoms are important because they will reduce suffering and increase the likelihood that abused women will access community resources to help them establish safety.

Besides treatment of women with IPV and PTSD, existing interventions for women with IPV have centered on advocacy. In a recent Cochrane review on advocacy interventions for women who have experienced IPV within or outside of health-care settings, the authors concluded that, overall, there is no compelling evidence that advocacy reduces or leads to a cessation of abuse (Ramsay et al. 2009). Additionally, the authors concluded that studies measuring primary outcomes besides IPV (e.g., severity of depression and PTSD) do not provide compelling evidence in support of advocacy for women with IPV. Based on this report, the authors concluded that additional trials are needed to test theoretically explicit interventions to determine what works (or does not work), for whom, when, and in what contexts as well as to examine a smaller range of outcomes which should be measured using more standardized scales.

Pregnancy represents a time of increased risk and vulnerability for violence and therefore represents an ideal time for intervention. The purpose of the present study was to examine the initial feasibility, acceptability, and effects of an intervention in reducing PTSD and depressive symptoms from pregnancy until 3 months postpartum in a sample of low-income, pregnant women with IPV within the last year.

Materials and methods

Sample recruitment

Participants for the study were recruited from three Rhode Island sites: two primary care clinics and one private OBGYN clinic. Pregnant subjects, between 18 and 40 years of age, who were attending their prenatal care visit, were approached to participate in the study.

Women were told about the study in a private room by a member of the study team. After consenting to the study, women completed a demographic form that included items related to household income level, marital status, weeks gestation, and parity. Additionally, women completed the Revised Conflict Tactic Scale (CTS2; Straus et al. 1996) that assessed IPV within the last year. Those women who screened positive for recent (past year) IPV, based on their CTS2 responses, were invited to participate in the next phase of the study. At a separate meeting, women were assessed for current affective disorders, PTSD, and substance use as determined by the relevant modules of the Structured Clinical Interview for the DSM-IV Axis I Disorders Nonpatient Version (SCID-NP) (First et al. 1996). Women who met criteria for any one of these disorders were excluded from the study and referred for appropriate treatment. We felt that to include these women in an intervention with unknown efficacy for these disorders would be unethical, given that efficacious treatments for these disorders are available. After completing all baseline assessments, women were randomly assigned to either the intervention or standard care condition. The randomization allocation schedule was generated by computer and concealed in consecutively numbered, sealed envelopes by the principal investigator who was masked to the women's intake assessments.

Intervention

The intervention was based primarily on the principles of Interpersonal Psychotherapy (IPT; Klerman et al. 1984), a pertinent theoretical framework. The IPT approach, with its emphasis on the enhancement of social support, is especially relevant for women with IPV because research has found social support to be protective against the negative effects of partner violence on women's mental health (Coker et al. 2003; Mitchell and Hudson 1983; Tan et al. 1995) such as symptoms of depression, PTSD, and anxiety. Also, women who experience less social support will be more likely victimized by partner violence (Van Wyk et al. 2003). Further, by decreasing isolation and enhancing social support, abused women are more likely to access appropriate resources. The IPT approach with its emphasis on strengthening social relationships is especially relevant to low-income women (Belle 1990; Collins et al. 1993). In addition to IPV, low-income women are frequently exposed to chronic strain and sources of stress, such as inadequate income, inadequate housing, and parenting worries (Dunkel-Schetter, 1998; Rini et al. 1999; Turner et al. 1990). Although stressful life events often have detrimental effects on physical and psychological health, social support has been found to limit these negative stress reactions (Cohen and Willis 1985; House et al. 1988; Oakley 1985; Ritter 1988). Moreover, social support has been found to mediate the impact of material loss on depressive symptoms among inner-city women (Hobfoll et al. 2003) and has been aptly referred to as "strategies for survival in a hostile world" for low-income women (Stack 1974). IPT principles may lessen perinatal difficulties as IPT has been shown to be efficacious as a treatment for perinatal depression (Stuart and O'Hara 1995) and as a group treatment for poor women with PTSD (Krupnick 2001). Additionally, an IPT-based intervention has demonstrated initial efficacy to reduce postpartum depression in pregnant woman on public assistance at risk for postpartum depression (Zlotnick et al. 2001; Zlotnick et al. 2006).

Assessments

The following measures were administered at intake, 5–6 weeks after intake, 2 weeks after delivery, and 3-month postpartum:

1. The Revised Conflict Tactic Scale (CTS2; Straus et al. 1996) is a revised version of the CTS which has been widely used in assessing physical, psychological, and sexual attacks on a partner in a marital, cohabitating, or dating relationship. The CTS2 has demonstrated excellent reliability and validity (Straus et al. 1996). At

intake, participants completed the CTS2 for each relationship with a partner (i.e., a marital, cohabitating, or dating relationship) within the past year. At each follow-up assessment, the CTS2 was administered for the interval period since the last assessment to date for the most recent partner.

2. At 3 months postpartum, the Longitudinal Interval Follow-up Examination (LIFE; Keller et al. 1987; Warshaw et al. 1994) a brief standardized interview was used to assess for the presence of a major depressive disorder and PTSD from intake until 3-month postpartum. The LIFE tracks the severity and course of the disorder utilizing diagnostic based systems. Psychiatric Status Ratings (PSRs), a 6-point measure of symptomatic status is created separately for each diagnosis based on DSM-IV criteria (from asymptomatic at PSR=1 to incapacitated at PSR=6). A PSR of 5 or 6 indicates the participant meets full DSM-IV diagnostic criteria for the given disorder with low to moderate and severe functional impairment, respectively (i.e., is an episode). A PSR of 3 or 4 indicates the participant does not meet full DSM-IV diagnostic criteria for the disorder but exhibits notable symptoms and impairment to a mild or moderate degree, respectively (i.e., subthreshold disorder). A PSR of 1 or 2 indicates the participant is either without symptoms of the disorder or experiences a negligible number of symptoms on an occasional and transient basis (i.e., not an episode). The symptoms used to define cases of postpartum depression are the same for depression that occurs at other times (O'Hara 1995). Studies have found interrater reliability and long-term test-retest reliability for the LIFE diagnostic ratings to be good to excellent for all affective disorders (Warshaw et al. 1994) and has been successfully used in over 100 different research programs with diverse populations (e.g., Gallagher-Thompson et al. 1990; Dawson et al. 1999) and even depressed mothers with infant children (Seifer et al. 2001).
3. The Edinburgh Postnatal Depression Scale (EPDS; Cox et al. 1987) was used to measure the depression level. The EPDS has established psychometric properties and is one of the most widely used self-reported instruments to assess for depressive symptoms in the postpartum and antenatal periods in diverse populations of perinatal women (Cox and Holden 2003; Thompson et al. 1998).
4. The Davidson Trauma Scale (Davidson, 1995) is a 17-item measure that assesses each DSM-IV symptom of PTSD on five-point frequency and severity scales. It is a widely used measure with good reliability and validity (Zlotnick et al. 1996).
5. Criterion A from the PTSD module of the SCID-NP (First et al. 1996) was used to assess for history of trauma.

Procedure

The IPT-based intervention involved four 60-min individual sessions over a 4-week period before delivery and followed by one 60-min individual “booster” session within 2 weeks of delivery. Consistent with the aims of IPT, the intervention was designed to help participants improve their significant interpersonal relationships, change their expectations about them, assist them in building, or improving their social support networks, and master their role transition to motherhood since deficits in these areas appear to play a salient role in the onset of perinatal depression and PTSD. Other components of the intervention are based on the empowerment and stabilization models—intervention models that experts in the field have recommended for women with interpersonal violence (Dutton 1992; Herman 1992).

Briefly, the content of the intervention sessions consisted of the following: The first session focused on topics that included a rationale for the program, review of the course outline, evaluation of healthy relationships, types of interpersonal disputes, and abusive

relationships. Topics for session 2 included stress management skills, consequences of abuse, cycle of abuse, and making a safety plan. Topics for session 3 included emotional risks of abuse—signs and symptoms of “baby blues,” and postpartum depression, PTSD and substance use, and the management of role transitions with an emphasis on transition to motherhood and self-care. Topics for session 4 included the development of a support system, techniques for asking for support, resolving interpersonal conflicts, and goal-setting. The last session (within 2 weeks of delivery) provided an opportunity to review and reinforce the content of the previous sessions (“booster” session) and address any new issues related to the birth of the infant. The first author (Dr. Zlotnick) provided training on how to deliver the highly scripted intervention and provided weekly supervision to the two study interventionists.

Women in the standard care condition received the usual medical care provided for pregnant women at their clinic as well as the educational material and a listing of resources for IPV. All participants were compensated with \$15 for the completion of the baseline interview; \$20.00 for the 6 weeks after intake assessment; and \$30.00 for both the 4-weeks and 3-months postpartum assessment. All procedures used in this study were approved by the Institutional Review Boards for Human Subjects Research at all participating sites.

Analyses

All analyses were conducted on the intent-to-treat sample. Summary statistics were compiled for the intervention and control groups on rates of IPV victimization and demographic characteristics. Group differences in baseline characteristics were examined using chi-square tests for categorical variables and one way ANOVAs for continuous variables. In our primary analyses we assessed for a major depressive disorder and PTSD using repeated-measures analysis of variance. Given that all of our dependent measures were assessed at multiple time points, we used the repeated-measures approach in our analyses. In secondary analyses we controlled for the presence of childhood sexual trauma.

Results

Of the 1,633 women approached to be in the study, 317 (19.4%) women denied the presence of intimate partner violence, 106 (6.5%) were already in some form of mental health treatment, 421 (25.8%) said they were too busy or gave no reason, and 578 (35.4%) were with their male partners. For safety reasons, we did not approach women who were with their partners. Two hundred and eleven women (12.9%) consented to participate in the study. Of these women 78 (37%) were excluded; main reasons included that participants reported only one instance of a very minor form of abuse (55; 70.5%), participants reported receiving mental health treatment (18; 23.1%), and others (5; 6.4%). A hundred and thirty-three women qualified for a baseline assessment. Of these women, many (53; 39.8%) could not be reached. Of the 80 women who were assessed, 21 were ineligible because they met criteria for a major depressive disorder (26.2%), three (3.7%) did not meet criteria for intimate partner abuse, one was receiving mental health treatment, and one woman's income was too high. The final sample was 54 pregnant women.

Sample characteristics

The final sample of 54 pregnant women in abusive relationships reported on average 35.9 acts of physical, sexual, and/or psychological abuse in the past year (intervention group, $M=33.4$; control group, $M=38.7$; $p=0.57$). In terms of severity of abuse, 38 (70.4%) participants reported at least one act of severe abuse in the past year with the majority of severe abuse being acts of psychological abuse (average of 4.7 severe psychological acts; 2.4 severe physical and 0.6 severe sexual). Table 1 presents the complete demographic characteristics

for the total sample and by group. Participants were on average 23.8 years old ($SD=4.6$), primarily Latino (42.6%), or White (38.9%), single (44.4%), high school graduates (57.4%), and on Medicaid (51.9%). There was a wide range of household incomes (ranging from 22% on public assistance to 16.7% \$30,000–\$49,000) and employment status (33.3% employed full time and 33.3% unemployed). All study participants met the low-income threshold for their household, which was based on the U.S. Housing and Urban Development threshold for low-income in Rhode Island (U.S. Department of Health and Human Services 2008). Chi-square and independent t tests showed there were no significant differences in demographics or frequency of IPV between the intervention and control groups. However, the intervention group and the control group differed on number of lifetime traumas. The intervention group reported significantly more traumas than the control group ($\chi^2=3.80$, $p=0.051$). In particular, rape and child molestation were more prevalent in the intervention group ($N=12$; 42.9%) compared to the control group ($N=4$; 15.4%). For the 54 women, the average age for rape was 12.5 years of age ($SD=4.5$), and for child molestation 6.3 years of age, $SD=3.56$. Since there is accumulating evidence from community-based studies that childhood sexual abuse and rape increases the risk of a major depressive disorder in women (Burnam et al. 1988; Buzi et al. 2007; Nolen-Hoeksema 2006; Weiss et al. 1999; Zlotnick and Johnson 2002) and exposure to these traumas relative to other traumatic events increases the likelihood of PTSD (Kessler et al. 1995; Zlotnick et al. 2008), we controlled for the presence of childhood sexual trauma in secondary analyses.

Treatment outcomes

Twenty-eight women were randomized to the intervention and 26 to the standard care condition. Women in the intervention attended on average, three out of the five available intervention sessions.

Depression outcomes

Primary analyses—There were no significant differences between the two groups in terms of cases of major depressive episodes (MDD) during the study period. Five women in the control condition (two during pregnancy) and six women (one during pregnancy) in the intervention condition experienced a major depressive disorder as measured by the LIFE interview.

We also analyzed PSRs for MDD as a continuous measure of depression across the pregnancy and postpartum time periods. The raw scores are presented in Table 2. We conducted a repeated-measures analysis of variance on the pregnancy and postpartum time periods using group as a predictor. The interaction between group and time was not significant, $F(1, 44)=1.73$, $p=0.19$. Despite the nonsignificant interaction, we explored the main effect for group within each time period given that this is a pilot study. We found a trend towards less depressive symptoms during pregnancy for the intervention group relative to the control condition $F(1, 44)=3.29$, $p=0.08$. No effects emerged during postpartum, $F(1, 44)=0.01$, $p=0.94$. The overall group effect across the two time periods was, $F(1, 44)=1.04$, $p=0.31$, $d=0.25$ (95% confidence interval= -0.05 to $+0.55$).

The EPDS was administered as a cross-sectional outcome of depressive symptoms. A t test found no significant differences between the intervention and control groups at baseline for depression measured by the EPDS, $t(52) 1.11$, $p=0.27$. The raw scores are shown in Table 3. We conducted a repeated-measures analysis of variance on the baseline, post-intake, 2-week, and 3 months postpartum time periods using group as the predictor. The interaction between group and time was not significant, $F(1, 34)=1.29$, $p=0.28$. We found a significant difference between the control and intervention group at post-intake, $F(1, 34)=4.07$, $p=0.05$, such that the intervention group reported less depressive symptoms than the control group.

No effects emerged at 2 weeks, $F(1, 34)=0.00$, $p=0.95$, or 3 months postpartum, $F(1, 34)=0.87$, $p=0.36$. The overall group effect across the time periods was, $F(1, 34)=1.67$, $p=0.20$, $d=0.35$.

Secondary analyses—We next controlled for the presence of childhood sexual trauma given that the intervention group reported significantly more rape and child molestation than the control group and this factor might be particularly important given the strong link between childhood sexual abuse/rape and depression.

First, we conducted the repeated-measures analysis of variance on the PSRs for MDD. Our model included the pregnancy and postpartum time periods as the repeated factor, group as the predictor variable and rape/molestation as a covariate. The interaction between group and rape/molestation was not significant, $F(1, 42)=2.35$, $p=0.13$. We found a marginally significant trend towards less depressive symptoms during pregnancy for the intervention group relative to the control condition $F(1, 42)=3.61$, $p=0.06$, $d=0.52$. No effects emerged during postpartum, $F(1, 42)=0.20$, $p=0.66$, $d=0.01$. The overall group effect across the two time periods was $F(1, 42)=1.77$, $p=0.19$. The overall effect size was a moderate effect of $d=0.37$ using the means adjusted for rape/molestation (control $M=2.18$; intervention $M=1.81$) and the standard deviation (0.987). Thus, by controlling for rape/molestation victimization, the intervention effect size increased from $d=0.25$ to $d=0.37$.

We next conducted a repeated-measures analysis of variance on the EPDS. Our model included the post-intake, 2-week, and 3-months time periods as the repeated factor, group as the predictor variable and rape/molestation as a covariate. The overall group effect across the time periods was, $F(1, 32)=1.59$, $p=0.22$, $d=0.32$. Controlling for rape/molestation did not improve the effect size for the EPDS.

Outcomes for posttraumatic stress disorder

Primary analyses—One woman in the intervention met criteria for PTSD for the duration of the study as measured by the LIFE. We next analyzed PSRs for PTSD as a continuous measure across the pregnancy and postpartum time periods. The raw scores are shown in Table 2. We conducted a repeated-measures analysis of variance on the pregnancy and postpartum time periods using group as a predictor. The interaction between group and time was not significant, $F(1, 44)=2.77$, $p=0.10$. We found a significant difference between the control and intervention group during pregnancy, $F(1, 44)=7.50$, $p=0.009$. No effects emerged during postpartum, $F(1, 44)=1.51$, $p=0.23$. The overall group effect across the two time periods was significant, $F(1, 44)=5.61$, $p=0.022$, $d=0.59$.

The Davidson Trauma Scale was administered as a cross-sectional outcome of PTSD symptoms. A t test found no significant differences between the intervention and control groups at baseline for PTSD measured by the Davidson Scale, $t(52) 1.25$, $p=0.22$. The raw scores are shown in Table 3. We conducted a repeated-measures analysis of variance on the baseline, post-intake group, 2-week, and 3-months time periods using group as the predictor. The interaction between group and time was not significant, $F(1, 31)=0.46$, $p=0.71$. We found no significant differences between the control and intervention group at post-intake, $F(1, 31)=1.48$, $p=0.23$, 2-weeks, $F(1, 31)=1.43$, $p=0.24$ or 3 months postpartum, $F(1, 31)=1.28$, $p=0.27$. The overall group effect across the four time periods was, $F(1, 31)=1.42$, $p=0.24$, $d=0.28$.

Secondary analyses—In exploratory analyses, we next controlled for the presence of childhood sexual trauma. First, we conducted the repeated-measures analysis of variance on the PSRs for PTSD. Our model included the pregnancy and postpartum time periods as the repeated factor, group as the predictor variable and rape/molestation as a covariate. The

interaction between group and rape/molestation was not significant, $F(1, 42)=0.06, p=0.81$. We found a significant difference between the control and intervention group during pregnancy, $F(1, 42)=9.29, p=0.004, d=0.78$. No differences emerged during postpartum, $F(1, 42)=0.88, p=0.35$. The overall group effect across the two time periods was significant, $F(1, 42)=5.67, p=0.022$. The overall effect size was a large effect of $d=0.69$ using the means adjusted for rape/molestation (control $M=1.75$; intervention $M=1.29$) and the standard deviation (.661). Thus, by controlling for rape/molestation victimization, the intervention effect size increased from $d=0.59$ to $d=0.69$.

We next conducted a repeated-measures analysis of variance on the Davidson Trauma scale. Our model included the post-intake, 2-week, and 3-months time periods as the repeated factor, group as the predictor variable and rape/molestation as a covariate. The overall group effect across the time periods was, $F(1,29)=0.66, p=0.42$. Controlling for rape/molestation did not improve the effect size for the Davidson Trauma Scale.

Abuse victimization outcomes

The Conflict Tactics Scale (CTS2) was administered as a cross-sectional outcome of IPV victimization. A t test found no significant differences between the intervention and control groups at baseline for frequency of abuse within the last year, $t(52) 0.57, p=0.57$ as measured by the CTS2. The frequencies are shown in Table 3. We conducted a repeated-measures analysis of variance on the post-intake, 2-week, and 3 months time periods using group as the predictor. The interaction between group and time was not significant, $F(1,35)=0.19, p=0.83$. We found no significant differences between the control and intervention group at post-intake, $F(1,35)=0.75, p=.39$, 2-week, $F(1,35)=1.61, p=0.21$, or 3 months postpartum, $F(1,35)=0.66, p=0.42$. The overall group effect across the time periods was, $F(1,35)=0.61, p=0.44, d=0.17$.

Thus, based on the observed effect sizes (ES) for group, results ranged from very small (0.01) to large (0.87) with ES for most measures being in the moderate range (0.40–0.60). Given an average sample size of 21 subjects in each group, the power to observe group differences over time ranged from 7% to 79% ($\alpha=0.05$). The average power for the moderate ES is approximately 40%. To achieve 80% power ($\alpha=0.05$) with a moderate ES, the sample size in each group would need to be 50 subjects.

Discussion and conclusion

This is the first study to examine whether an intervention for low-income pregnant women with recent IPV reduces the risk of postpartum depression and PTSD. This study found that the IPT-based intervention compared to a standard care condition did not significantly reduce the likelihood of cases of a major depressive episode or PTSD from randomization, during pregnancy, or up to 3-months postpartum nor did the IPT-based intervention significantly reduce symptoms of PTSD or depression during the postpartum period. However, our findings of moderate effects for the IPT-based intervention in reducing symptoms of PTSD and depression during pregnancy and a large effect for PTSD symptoms from pregnancy up to 3 months postpartum suggest that our intervention may be efficacious with a larger trial. Furthermore, attendance for the intervention (on average three of the five sessions) was relatively good for perinatal women and good for low-income women who often have many competing needs and demands and whose lives may be chaotic. The high attendance rate for our intervention suggests that this intervention was acceptable to most of the participants.

Consistent with most intervention studies with women with IPV, the intervention did not significantly reduce IPV relative to the standard care condition (rates of IPV decreased at the

3 months postpartum follow-up for both groups). The only study with pregnant women, to date, that found significant reductions in IPV and depressive symptoms postpartum for the intervention group compared to a comparison condition (Tiwari et al. 2005) found differences in psychological abuse and minor physical abuse. Furthermore, the pregnant women in this study (Tiwari et al. 2005) reported mostly minor psychological abuse. In contrast, 70% of the women in our sample reported at least one act of severe abuse in the past year. Since severity of IPV is related to greater impairment (Johnson et al. 2008), the impact of a relatively brief intervention may be limited in women with severe forms of abuse. A recent study supports this idea. A randomized controlled trial, aimed at providing assistance and services to families, involved a 3-year intensive home visitation program beginning during the postpartum period. Intervention mothers reported lower levels of IPV compared to a control group during the intervention phase (but not during follow-up assessments); this was only true for physical abuse (Bair-Merritt et al. 2010). It was our experience that women in the intervention disclosed more severe forms of violence after the first two intervention sessions. This suggests women may have needed time to build trust before they could fully engage in the intervention. Perhaps more sessions during pregnancy or more than the one booster session during the postpartum period (which mainly took place on average 10 weeks after the last antenatal session) may have strengthened the effect of our intervention. Future interventions with pregnant women involving multiple sessions postpartum may be beneficial. Since pregnant women are more likely than postpartum women or women at other times in their lives to generally be less compliant with mental health interventions (O'Mahen and Flynn 2008), perhaps women would be willing to receive more intervention sessions during the postpartum period.

Our intervention, however, appeared promising in reducing PTSD symptoms during pregnancy and up to 3 months postpartum. Our intervention incorporated strategies from stabilization and empowerment models of treatment for women with IPV, which have been found to be efficacious in reducing PTSD symptoms in women with recent IPV (Johnson and Zlotnick 2008). Possibly incorporating more of these strategies into our intervention may enhance the effects of our intervention for low-income women.

Secondary analyses found that there was a moderate effect for women with histories of childhood sexual abuse and rape compared to women in the control condition in reducing level of depressive symptoms and a large effect in reducing level of PTSD symptoms from intake to 3-months postpartum. These exploratory findings give us reason to believe that in future studies of our intervention, prior history of interpersonal violence is a possible moderator of the effect of IPT that should be controlled. Childhood sexual abuse has been found to be related to depressive symptoms among low-income women (Rayburn et al. 2005), among women who have left an abusive relationship (Koopman et al. 2007), and among postpartum women (Buist and Janson 2001). A recent study of perinatal women found that pregnant women who reported histories of abuse were five times at greater risk for postpartum depression than their counterparts without such experiences (Records and Rice 2009). Additionally, research has found a high co-occurrence of childhood sexual abuse and PTSD, especially hyperarousal symptoms (Griffing et al. 2006). Furthermore, a history of child sexual abuse is associated with current PTSD symptoms within the cumulative context of other adult trauma (Nishith et al. 2000).

Results of this study must be viewed in light of the constraints of this investigation. Since the study did not recruit women whose partners were present, the intervention was tested with a select group of women. Perhaps a percent of the women with partners present for their prenatal visit may have had partners who were particularly controlling and abusive. It is therefore unknown how these women may have responded to the intervention. Also, at least 54% of women approached to be in the study denied any IPV or refused to participate

in the study. It is therefore unknown as to what percent of these women may have had IPV experiences and if participants in the study were representative of women with IPV. Unfortunately, we were unable to reach 34% of the consented women who reported IPV and engage them in the next phase of the study (i.e., intake assessments prior to randomization). Most preventive intervention with pregnant women that report rates of drop-out from consent to further assessment prior to randomization report high attrition rates. Due to safety reasons, we could not be overly persistent in our attempts to reach potential participants. Furthermore, since this was a pilot study, caution should be used in extrapolating these findings to other groups of pregnant women since study participants were recruited from a limited geographic location and we had limited power.

There are many challenges inherent in working with a vulnerable group of women with IPV. We were careful to follow the recommended precautions (see Sullivan and Cain, 2004) to maximize study participant safety throughout the research study. Even working within these tight restrictions, we were able to consent 12% of women approached, which is above the reported rates of IPV within the last year for pregnant women (Gazmararian et al. 1996) and had only 15% drop-out rate once women were randomized, which is consistent with the only other preventive intervention study with pregnant low-income women with IPV (McFarlane et al. 2000). These pilot findings add important information to our knowledge concerning IPV interventions among a low-income population. While these results are encouraging, larger randomized trials are needed to further examine the intervention both during and after pregnancy. Furthermore, future studies should include an attention-matched control group to determine if positive intervention outcomes are attributable to differences in attention between the conditions or to the “active ingredients” of the IPT-based intervention.

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Table 1

Sample characteristics, total and by group

	Total (n=54)	Intervention (n=28)	Control (n=26)	P Value
Age, mean (sd)	23.8 (4.6)	24.2 (4.4)	23.5(4.7)	0.55
Race/ethnicity%				0.73
White	38.9	35.7	42.3	
Hispanic	42.6	42.9	42.3	
Black	11.1	14.3	7.7	
Other/Multiracial	7.4	7.1	7.7	
Marital Status%				0.47
Single	44.4	39.3	50.0	
Married	24.1	25.0	23.1	
Cohabitating	18.5	21.4	15.4	
Divorced/Separated	11.1	10.7	11.5	
Education%				0.38
College Graduate	13.0	10.7	15.4	
High School Graduate	57.4	64.3	50.0	
Some high School	25.9	17.9	34.6	
Prior Pregnancies, mean (sd)	0.83 (0.88)	0.89 (0.87)	0.77(0.91)	0.40
Gestational weeks, mean (sd)	21.3(8.5)	21.6(9.0)	20.9(8.2)	0.80
First pregnancy%	42.6	35.7	50.0	0.40

Table 2
Means, standard deviations (SD), and effect sizes for the LIFE MDD and PTSD PSRs^a

	Intervention (n=25)		Control (n=21)		Effect Size
	Mean	SD	Mean	SD	
MDD PSRs					
Pregnancy	1.65	(0.81)	2.11	(0.94)	0.52
Postpartum	2.05	(1.12)	2.08	(1.08)	0.01
PTSD PSRs					
Pregnancy	1.27	(0.39)	1.83	(0.93)	0.78
Postpartum	1.30	(0.52)	1.52	(0.71)	0.35

^aMajor Depressive Episodes Psychiatric Status Ratings

Table 3

Means, standard deviations (SD), and effect sizes for the EPDS, Davidson Trauma Scale, and CTS2

EPDS	Intervention		Control		Effect size
	Mean	SD	Mean	SD	
Baseline	7.18	(4.36)	8.77	(6.07)	0.30
Postpartum	6.84	(4.10)	9.84	(6.05)	0.60
2 week postpartum	6.68	(5.54)	7.14	(5.18)	0.09
3 months postpartum	6.12	(5.86)	8.00	(5.74)	0.32
Davidson Trauma Scale					
Baseline	9.96	(10.62)	16.11	(23.49)	0.34
Postpartum	5.58	(7.51)	12.08	(17.60)	0.48
2 week postpartum	6.04	(7.75)	10.09	(16.09)	0.18
3 months postpartum	8.44	(13.98)	9.19	(14.20)	0.05
CTS2					
Baseline	33.4	(28.4)	38.7	(39.0)	0.15
Postpartum	7.8	(15.6)	12.7	(24.1)	0.24
2-week postpartum	7.3	(11.6)	5.9	(9.0)	0.13
3 months postpartum	16.3	(28.6)	12.1	(23.1)	0.16

For the CTS2, the baseline means are frequencies for the past year
The other time periods are mean frequency from the last assessment.